

2007-08 ENGINE PERFORMANCE**Fuel System - Repair Instructions - X5 (6-Cylinder)****31 FUEL PUMP WITH DRIVE****13 31 ... NOTES ON FUEL PRESSURE CHECK (REFERENCE PRESSURE: ENVIRONMENT)****Feature of this version with ambient pressure:**

The connection for the vacuum hose of the fuel pressure regulator is located between the throttle and the air cleaner or on the air cleaner.

Test precondition:

The correct fuel pressure regulator is fitted.

- Using the EPC, check whether the fuel pressure regulator suitable for the car is fitted: Connect test adapter.

Description of operation:

The control function of the fuel pressure regulator must be guaranteed under all operating conditions. The fuel pump must always be able to generate a higher fuel pressure than the pressure regulated by the pressure regulator.

The injection rate is adjusted by means of the injection time; the injection time is controlled by the DME.

Description of operation: fuel return line

When the engine is at a standstill and the ignition key is in position 0, the fuel return line after the pressure regulator is at zero pressure.

Description of operation: pressure retaining function

The pressure regulator closes when the engine is at a standstill and the ignition key is in position 0. The fuel pressure in the delivery line is retained over an extended period. A non-return valve closes in the fuel pump. These measures help to retain the fuel pressure in the fuel system. Extended starting times are thus avoided.

Complaint: drive characteristic faults, lack of power

- Run engine at idle speed and measure fuel pressure.

If the measured value is less than the nominal value - 0.2 bar:

- Line cross-sections in fuel feed are constricted or fuel filter is clogged,

or

- Fuel pump voltage supply is not O.K.: e.g. as a result of high contact resistance (corrosion) in plug connection between wiring harness and fuel pump.

If the measured value is greater than the nominal value + 0.2 bar:

- Turn off engine stop and then observe measured value.
- If measured value drops to nominal value, then line cross-sections in fuel return are constricted or clogged.
- Check the fuel lines for kinks.

If no kinks are visible:

- Replace return lines

If measured value remains too high, then pressure regulator is in all probability faulty.

IMPORTANT: With less likelihood, the return line may be completely blocked. When the pressure regulator is removed, fuel could escape under pressure!

- Have a cleaning cloth ready and catch and dispose of escaping fuel.
- Replace the return line but not the pressure regulator.

Complaint: starting problems

- Run engine briefly at idle speed and switch off.
- Note down measured value while engine is stopped.
- Read off measured value again after approx. 20 to 30 minutes while engine is stopped.

Special tool 13 3 010 (hose clamp) is required for the following test.

If the measured value has dropped by more than 0.5 bar:

- Start engine and wait briefly for a stable pressure increase.
- Switch off the engine and immediately pinch off the delivery line just before the pressure gauge with the special tool 13 3 010.
- Note down measured value
- Read off measured value again after approx. 20 to 30 minutes while engine is stopped

If the measured value has now dropped by less than 0.5 bar, the following faults can be present:

- Fault in delivery lines
- Fault in in-tank delivery hose

- Faulty pressure-holding non-return valve in fuel pump

Check components. Replace faulty components.

If the measured value has dropped by more than 0.5 bar again:

- Replace pressure regulator

NOTE:

- **All the fuel hoses and hose clips which were detached within the framework of the checks must be replaced.**
- **Interrogate fault memory of DME control unit. Check stored fault messages. Rectify faults. Now clear the fault memory.**

13 31 029 CHECKING FUEL PUMP DELIVERY PRESSURE (N52K)

Special tools required:

- 13 5 220
- 13 5 221
- 13 5 222

IMPORTANT: The fuel in the fuel lines is under pressure (approx. 5 bar)! Catch and dispose of escaping fuel.

Necessary preliminary tasks:

- Switch off ignition
- Remove acoustic cover and air filter housing on right

Remove dust cap (1).

Connect special tool kit 13 5 220 (comprising 13 5 221 and 13 5 222) to pressure sensor of DIS Tester.

Connect pressure sensor to DIS Tester.



Fig. 1: Identifying Non-Return Valve On Special Tool (13 5 220)

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not under any circumstances screw in the check valve up to the mechanical stop. This could damage the valve in the pressure regulator housing.

Mount special tool kit 13 5 220 to injection tube and tighten knurled nut hand-tight.

Screw out check valve (1) so that valve in pressure regulator housing is closed.

Start engine.

Screw in check valve (1) until a pressure reading is indicated on DIS Tester.

Measuring fuel pressure:

- Select Measurement.
- Multimeter function appears
- Select Pressure test
- Read off value of fuel pressure.

Compare actual value of test pressure with specified value. See **FUEL SUPPLY SYSTEM - TECHNICAL DATA** .

NOTE: Removing special tool kit 13 5 220:

- Switch off engine.
- Screw out check valve fully again.
- Remove special tool kit 13 5 220 from pressure regulator housing.
- Catch and dispose of escaping fuel.

NOTE: Read out fault memory of DME control unit. Check stored fault messages. Now clear the fault memory.

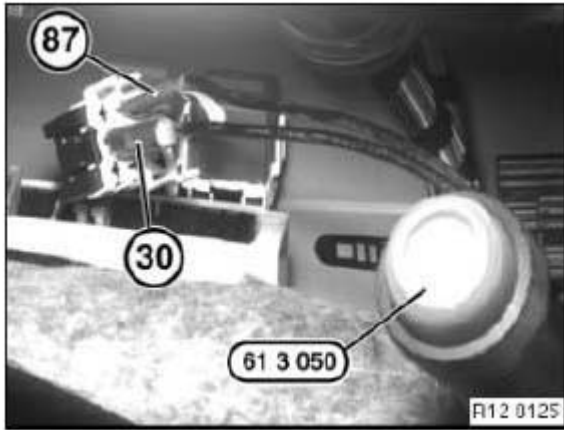


Fig. 2: Identifying Special Tool (61 3 050)
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Now clear the fault memory.

32 FUEL FILTER

13 32 051 REPLACING FUEL FILTER (M57T2)

Necessary preliminary tasks:

- Switch off ignition
- Remove rear assembly underside protection

Recycling:

Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

Release clamps (1).

Pull off hose.

Pull out retainer (2).

Detach fuel preheater (3) in direction of arrow. 1863 of 3160

Remove fuel filter.

Installation:

Modify retaining clamp.

Add final details to vehicle.

Installation:

Venting fuel system:

Vent fuel system with BMW diagnosis tester.

53 INJECTION NOZZLE AND LINES

13 53 240 REPLACING COMPLETE INJECTION PIPE (N52/ N52K)

Special tools required:

- 13 5 281

Necessary preliminary tasks:

- Read out fault memory of DME control unit
- Switch off ignition
- Remove clean air pipe
- Remove ignition coil cover

Recycling

Fuel escapes when fuel line is detached. Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

N52K only:

Unclip plug connection (1) from holder (2) and disconnect.

Unclip wiring harnesses from holder (2) and connector strip (3).

Disconnect holder (2) from injection pipe.

Remove protective cap from compressed air valve.

Connect compressed air line (1) to compressed air valve.

Blow fuel back into tank with a short blast of compressed air (max. 3 bar).

Unlock and detach fuel line (1).

Detach connector strip (2) in direction of arrow. Release screws.

Remove injection pipe (3).

Seal fuel hose with special tool 13 5 281.

Lever out retainers (1).

Pull fuel injectors out of injection pipe.

Installation:

Replace sealing rings on fuel injectors and coat with anti-friction rubber coating.

NOTE: Check stored fault messages.

Now clear the fault memory.

13 53 540 REPLACING, SEALING FUEL HOSES

Special tools required:

- 13 5 281

WARNING: Fuel in fuel lines is under pressure (approx. 3-5 bar).

Recycling

Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

Version with compressed-air connection:

Blow fuel back into tank with a short blast of compressed air (max. 3 bar) at compressed air connection (1).

For version with fuel hoses with integrated unlocking device:

Press fuel hose (1) downwards and keep pressed.

1865 of 3160

Press unlocking ring (2) upwards, keep pressed and detach fuel hose (1).

Installation:

Check O-ring in fuel hose and sealing surfaces on fuel lines for damage; replace components if necessary.

Coat O-ring for assembly with anti-friction agent.

Remove fuel line.

Fuel hoses with quick-release couplings:

Seal fuel hoses (1&2) with special tool 13 5 281.

Installation:

Check O-ring in fuel hose and sealing surfaces on fuel lines for damage; replace components if necessary.

Coat O-ring for assembly with anti-friction agent.

13 64 501 REMOVING AND INSTALLING/REPLACING A FUEL INJECTOR (N52, N52K, N51)

This work step is described in the article Removing complete injection pipe. **13 53 240 Replacing Complete Injection Pipe (N52/ N52K)**

54 THROTTLE AND OPERATION**13 54 030 REMOVING AND INSTALLING/SEALING THROTTLE VALVE ASSEMBLY (N52 / N52K / N51 / N53)**

Read and comply with notes on protection against electrostatic damage (ESD protection) **61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE)** .

Necessary preliminary tasks:

- Switch off ignition
- Remove air intake hose. See **13 54 250 Replacing Intake Hose (N52K)**

Unlock plug (1) and remove.

Release screws.

Remove throttle assembly (2).

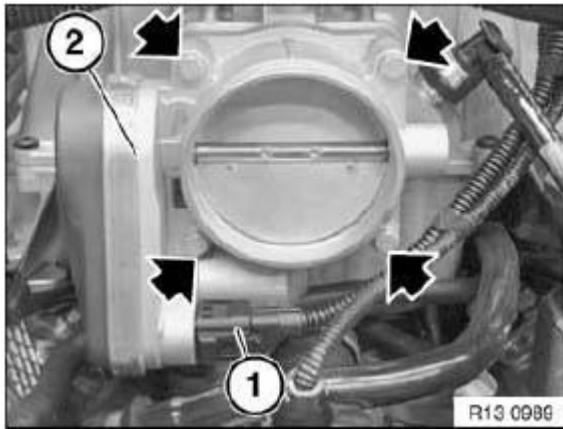


Fig. 3: Locating Screws And Throttle Assembly
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Replace sealing ring (1) of throttle assembly (2).

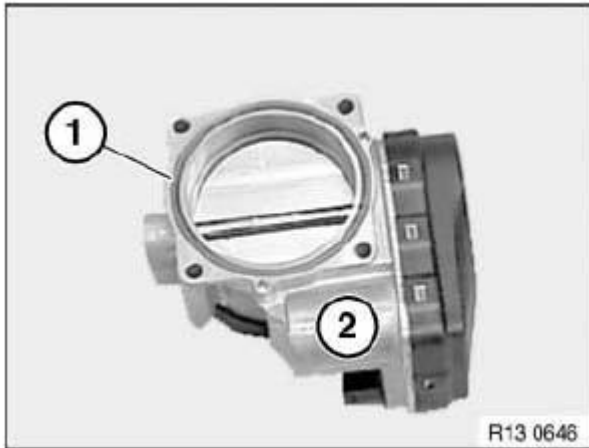


Fig. 4: Identifying Sealing Ring And Throttle Assembly
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Check stored fault messages.

Now clear the fault memory.

13 54 250 REPLACING INTAKE HOSE (N52K)

Necessary preliminary tasks:

- Switch off ignition
- Remove intake filter housing **13 71 000 Removing and installing/replacing intake filter housing (N52K)**

Remove wiring harness (1) from holder and place to one side. Unfasten clip.

Tightening torque 13 71 1AZ **13 71 000 Removing and installing/replacing intake filter housing (N52K)**.

Detach air-mass flow sensor (2) from throttle valve assembly.

62 SENSOR FOR CONTROL UNIT

13 62 010 REMOVING AND INSTALLING/REPLACING DIFFERENTIAL PRESSURE SENSOR (N52 / N52K / N51)

Necessary preliminary tasks:

- **E90 / E91 / E92 / E93 / E87:**

Remove lower section of microfilter housing.

- **E85 / E86 E90 / E91 / E92 / E93:**

Remove left tension strut on suspension strut dome

- **E70:**

Remove intake filter housing **13 71 000 Removing and installing/replacing intake filter housing (N52K)**

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection) 61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE) .

Release screws.

Unlock plug (1) and remove.

Pull differential pressure sensor (1) out of intake air manifold.

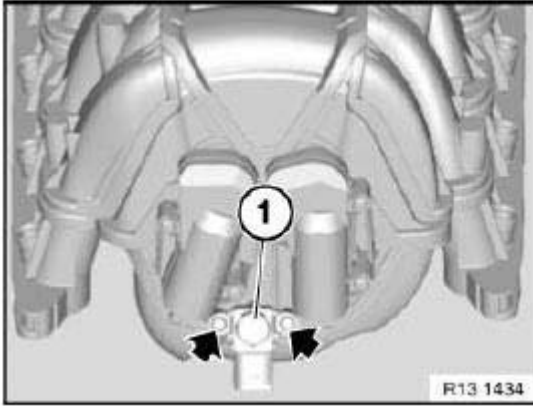


Fig. 5: Identifying Differential Pressure Sensor
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Read out fault memory of control unit of Digital Engine Electronics (DME).

Check stored fault messages.

Now clear the fault memory.

13 62 531 REPLACING COOLANT TEMPERATURE SENSOR (N52K)

WARNING: Danger of scalding!
 Only perform these tasks on an engine that has cooled down.

Recycling

Catch and dispose of escaping coolant.

Observe country-specific waste-disposal regulations.

Necessary preliminary tasks:

- Read out fault memory of DME control unit; if necessary, work through test schedules
- Switch off ignition

Lever out expansion rivets (1).

Press lock (2) and raise intake duct (3).

Detach intake duct (3) from air filter housing and remove

Unclip Bowden cable for engine bonnet/hood actuator from transverse reinforcement (1).

Release screws on left and right sides. Tightening torque 51 71 4AZ, see **51 71 SEALS AND LOOSE BODY PARTS** .

Remove cross-brace (1).

Coolant temperature sensor is mounted on cylinder head at front.

Unlock plug (1) and remove.

Release temperature sensor (2).

Installation:

Tightening torque 13 62 2AZ, see **13 62 SENDERS FOR CONTROL UNIT (1 OF 2)** .

If necessary, top up coolant.

Check cooling system for leaks **17 00 009 CHECKING COOLING SYSTEM FOR WATER LEAKS** .

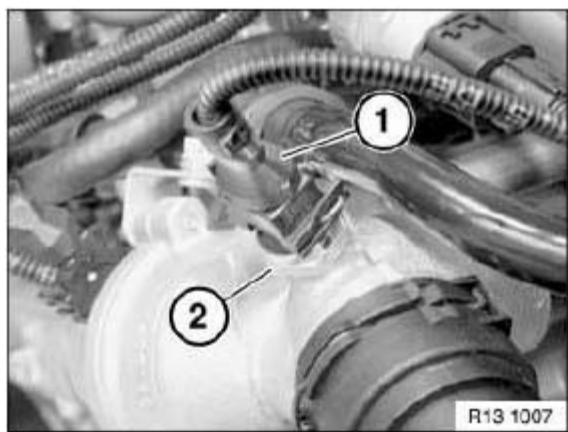


Fig. 6: Identifying Plug And Temperature Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Now clear the fault memory.**

13 62 560 REMOVING AND INSTALLING/REPLACING AIR-MASS FLOW SENSOR (N52 / N52K / N53)

Necessary preliminary tasks:

- Read out fault memory of DME control unit; if necessary, work through test schedules
- Switch off ignition

Release bolts.

Unlock plug (1) and remove.

Pull air-mass flow sensor (2) out of upper section of intake filter housing.

NOTE: Check stored fault messages.

Now clear the fault memory.

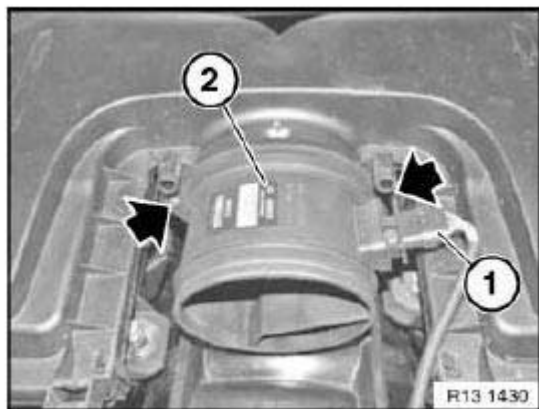


Fig. 7: Identifying Plug And Air-Mass Flow Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Check stored fault messages.
Now clear the fault memory.

64 START VALVES

13 64 541 REPLACING ALL FUEL INJECTORS

This work step is described in 13 53 240 Replacing Complete Injection Pipe (N52/ N52K).

71 INTAKE SILENCER

13 71 000 REMOVING AND INSTALLING/REPLACING INTAKE FILTER HOUSING (N52K)

Necessary preliminary tasks:

- Switch off ignition

Lever out expansion rivets (1).

Press lock (2) and raise intake duct (3).

Detach intake duct (3) from air filter housing and remove.

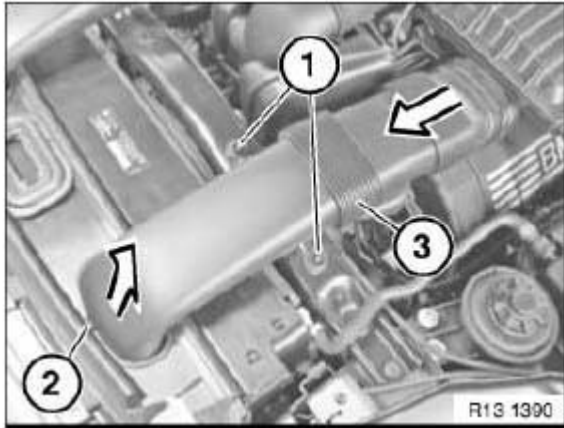


Fig. 8: Identifying Expansion Rivets, Lock And Intake Duct
Courtesy of BMW OF NORTH AMERICA, INC.

Pull off plug (1).

Release clamp (2) and detach air intake hose.

Unclip line (3), detach intake filter housing (4) from bearing and remove.

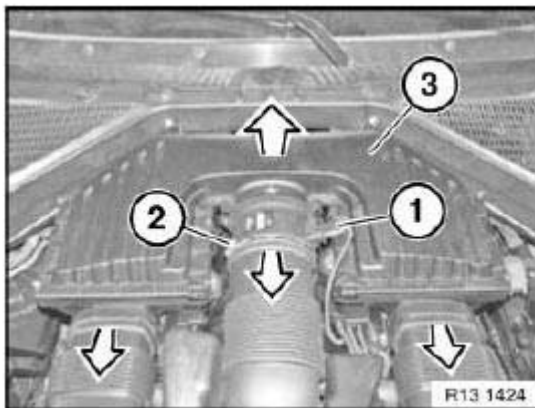


Fig. 9: Identifying Clamp And Intake Filter Housing
Courtesy of BMW OF NORTH AMERICA, INC.

72 AIR CLEANER

13 72 001 REPLACING BOTH AIR CLEANER ELEMENTS (N52K)

Necessary preliminary tasks:

Switch off ignition.

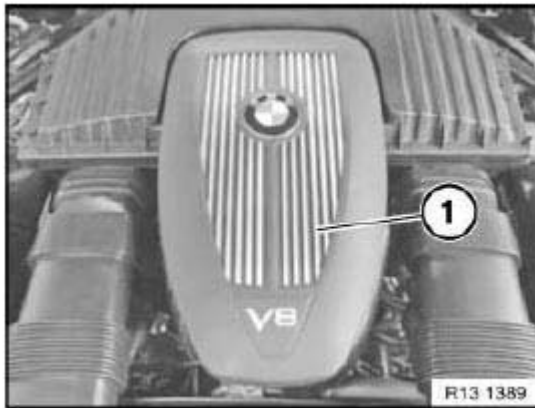


Fig. 10: Identifying Cover

Courtesy of BMW OF NORTH AMERICA, INC.

Pull off plug (1).

Release clamp (2) and detach air intake hose.

Open retainers and remove upper section (3) of intake filter housing.

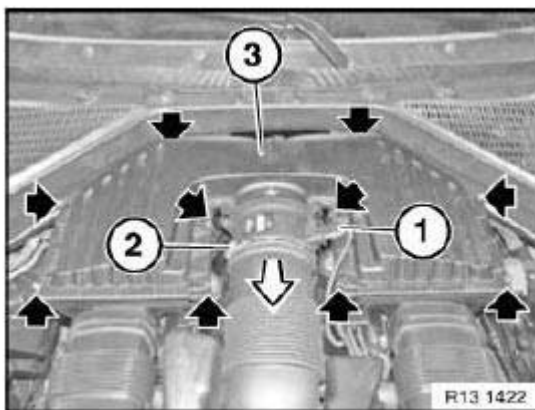


Fig. 11: Identifying Plug, Clamp And Upper Section

Courtesy of BMW OF NORTH AMERICA, INC.

Remove air cleaner element (1).

Installation:

Clean upper and lower sections of intake filter housing from inside.

Insert new air cleaner elements.

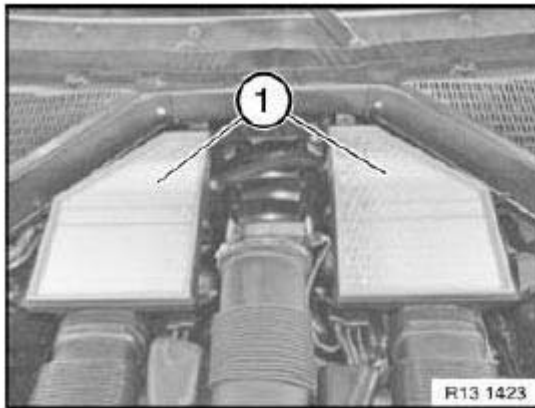


Fig. 12: Identifying Air Cleaner Elements
Courtesy of BMW OF NORTH AMERICA, INC.

90 CARBON CANISTER VENTILATION

13 90 500 REPLACING TANK VENT VALVE ((N52 / N52K / N51 / N53)

Necessary preliminary tasks:

- Check stored fault messages
- Switch off ignition
- Remove throttle valve assembly

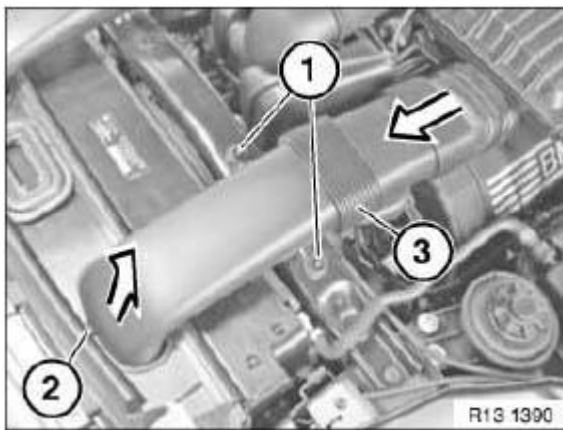


Fig. 13: Identifying Expansion Rivets, Lock And Intake Duct
Courtesy of BMW OF NORTH AMERICA, INC.

Installation location:

Tank vent valve is fitted at bottom on intake air manifold.
1874 of 3160

Unlock plug (1) and remove

Unlock hose (2) and detach.

Unlock hose (3) on intake manifold and detach.

Detach tank vent valve (4) from bracket and remove.

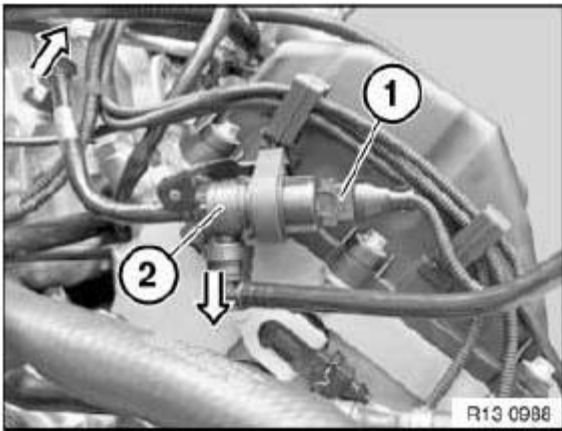


Fig. 14: Identifying Plug And Tank Venting Valve
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Read out fault memory of DME control unit.

Now clear the fault memory.